Ohio Statewide Model Development

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Three Phase Development

- **Preliminary Development** (1998,1999)
  Needs Survey, Model Design, and Plan/Scope
- **Data Collection (2000-2003)**
  Surveys, Network Data, Other Sources, Interim Model
- **Model Development**
  Model Estimation, Programming, Calibration, Validation

Preliminary Development, Phase I

Needs Survey, Model Design, Plan/Scope.
scope avail. on web: www.dot.state.oh.us/urban/AboutUs/Statewide_scope.htm

3 of the top priorities:

1. Truck/Frieght Flow
2. Economic Vitality
3. Traditional Congestion Measures

Data Collection, Phase II (see attached timeline)

- Cordon Line Surveys (1995, 1996, 1997) 700 roadside interview locations.
- Travel Time Surveys (2000)
- HH Interview Surveys (Rural and 9 MPO Urban Area) 3Cs were done by MPO
- Long Distance Survey
- GPS Under Reporting Survey
- General Establishment Survey(includes special gen.)
- Traffic Counts
- Existing Data from various sources
  - ODOT's Road Inventory
  - ODOT's Traffic Count Program
  - ODJFS ES202 employment data
  - 2000 Census, CTPP, PUMS
  - MPO's urban area model data
  - DPS traffic crash database
  - IMPLAN data
  - ODNR land use/land cover data
  - American Housing Survey
  - County assessor files
  - Previous MPO Travel Surveys (3C)
  - 1997 Commodity Flow Survey
  - PIERS Database

Eastern Border Transport Coalition Database
Reebie Freight flow database
American Travel Survey
NPTS
BTS- National Rail Network, Air , Waterways, Highways Network databases
... Other misc.

- Interim Model (see several attached graphics)
+ Completed early 2002
+ Covers State of Ohio. Network roughly ends at state border. 1214 zones or STADs, 50,000 links.
+ Mostly automated process to create network from ODOT's GIS/Road Inventory centerline files. MPO model networks were used to give better one way street definitions, out of state portions of network, counts on non-state system roads.
+ Applied ODOT's Capacity & Speed Calculators.
+ Just a network and car&Truck Trip Tables
+ Trip Table using TRANSCADS Matrix Estimation (count to trip table) with car and truck seed trip tables developed using O&D survey data, MPO Trip Tables, and Alan Horwitz's Statewide QRM
+ Very simple 1 auto matrix and 1 truck matrix. Limited number of uses.
* Diversion estimation,
* Percent thru traffic for studies.
* FRATAR based growth factors for some simple forecasts using Pop & Emp.
* Has been used for Turnpike study, Access Ohio (ODOT's LRP) to identify & evaluate Macro Corridor definitions, Pittsburg freeway connector, and Diversion to US 68 corridor..
* Using TRANSCAD for modeling and GIS.

Model Development, Phase III
- Completed Statewide Model (Planned completion date 2005)

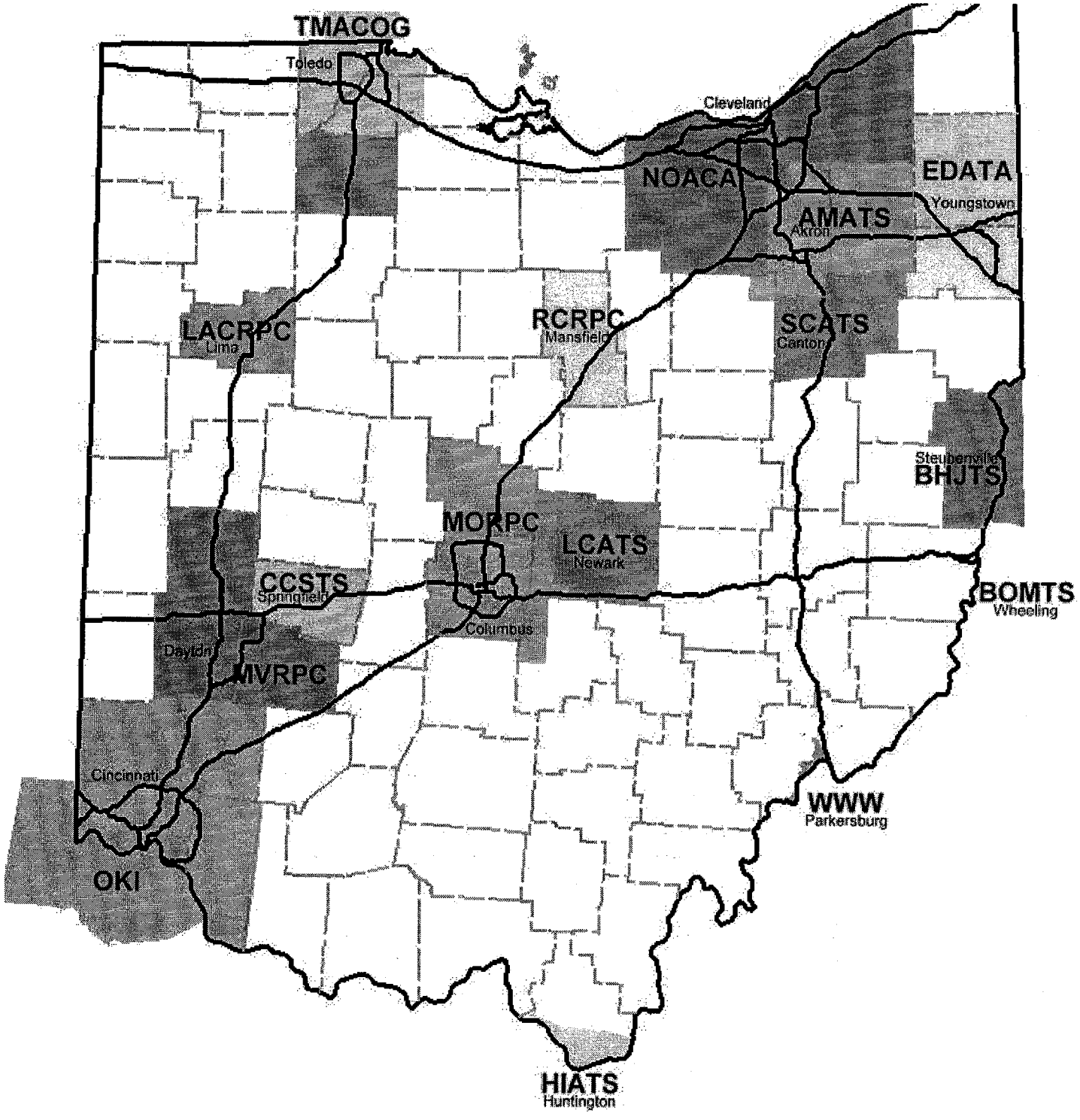
- Benefits and Uses
+ Project level certified traffic forecasts for rural area highways (same as MPO area models)
+ Reduce or eliminate the need for project specific O&D surveys.
+ Bypass Studies in rural areas
+ Turnpike toll sensitivity
+ Freight flow forecasts. Evaluate impact of frieght specific highway improvements
+ Environmental Justice
+ Congestion Management (forecasted statewide congestion statistics. Forecasted congestion)
+ Evaluate investments in other modes, rail, air, water, etc.
+ Evaluate impacts of some transportation policies
+ Evaluate impacts of highway improvements on the economy of the state

- Extent of Model

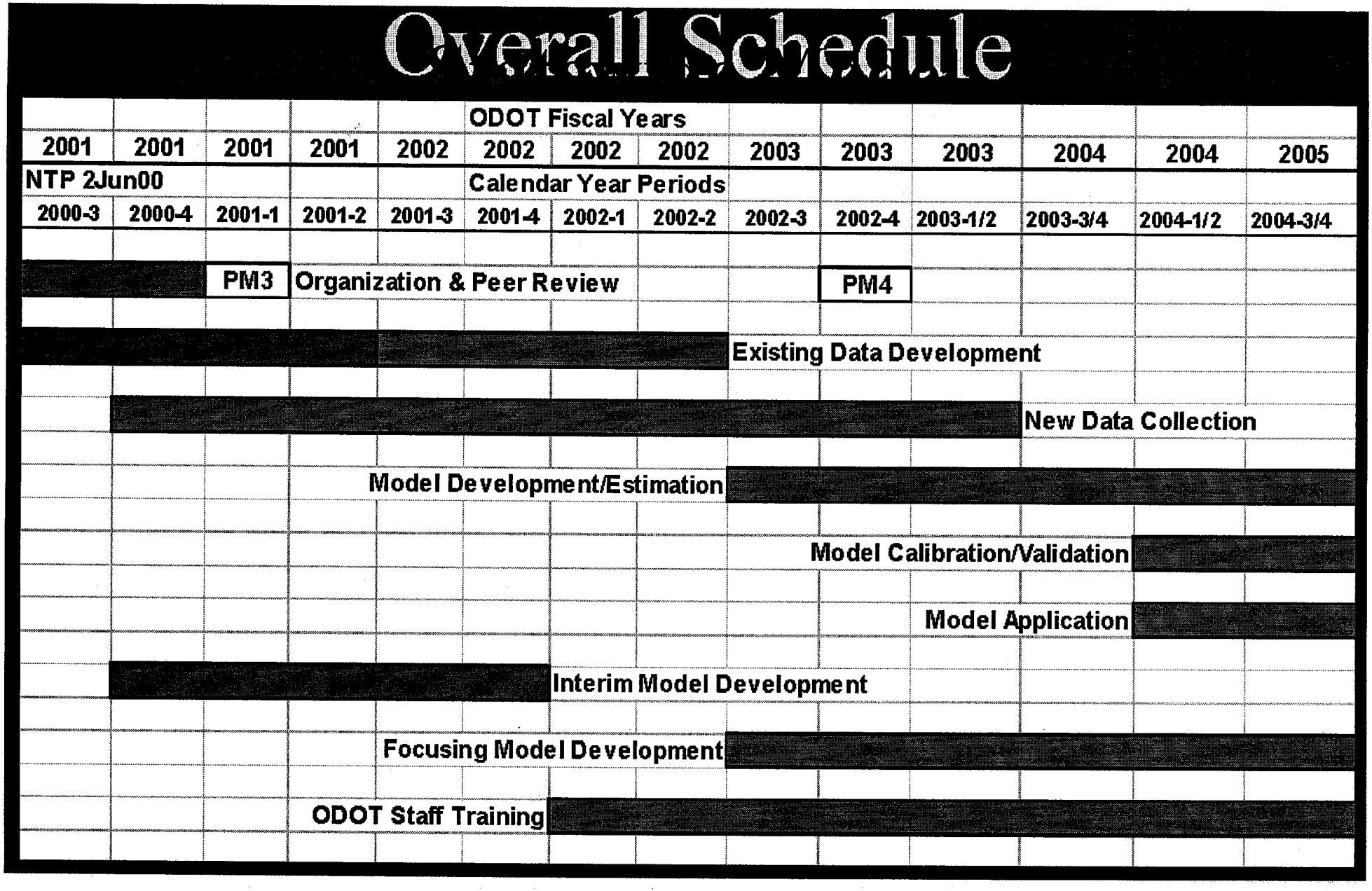
+ US Borders
+ 6000 - 7000 TAZs (See Attached graphic)
+ Within Ohio, All State, US, and Interstate functional classes plus off state system functional class collector and above.
+ FTA Rail Network
+ Corps of Engineers Inland Water Network
+ Air network custom built to link airports

- Key Features
+ Econometric Models
+ Probably Tour Based OD
+ Land use Modeling
+ Destination Choice Model (Logit)
+ Networks Built from Road Inventory
+ Automated Project Level focusing process
+ Consistency with urban models
+ Ability to assist with creating urban model external forecasts
+ Land use model with feedback from transportation model
+ Feedback from assignment to all model steps
+ Freight/commodity flow modeling
+ Advanced GIS based reporting/analysis capabilities

- MODEL Components
+ Input/output: Land Use/Land Value, Population(Cohort Survival, migration), Transportation, Freight/Buisiness Travel, Work Travel, Congestion Level.
+ Model of North American Economy (Social Accounting Matrices Relating Different Sectors of the Economy Using IMPLAN Data)
+ Business Location Model
+ Household Location Model
+ Non-work Travel Model


TMACOG
Toledo
Cleveland
NOACA
EDATA
Youngstown
AMATS
Akron
LACRPC
Lima
RCRPC
Mansfield
SCATS
Canton
Steubenville
BHJTS
MORPC
LCATS
Newark
CCSTS
Springfield
Columbus
BOMTS
Wheeling
Dayton
MVRPC
Cincinnati
OKI
WWW
Parkersburg
HIATS
Huntington

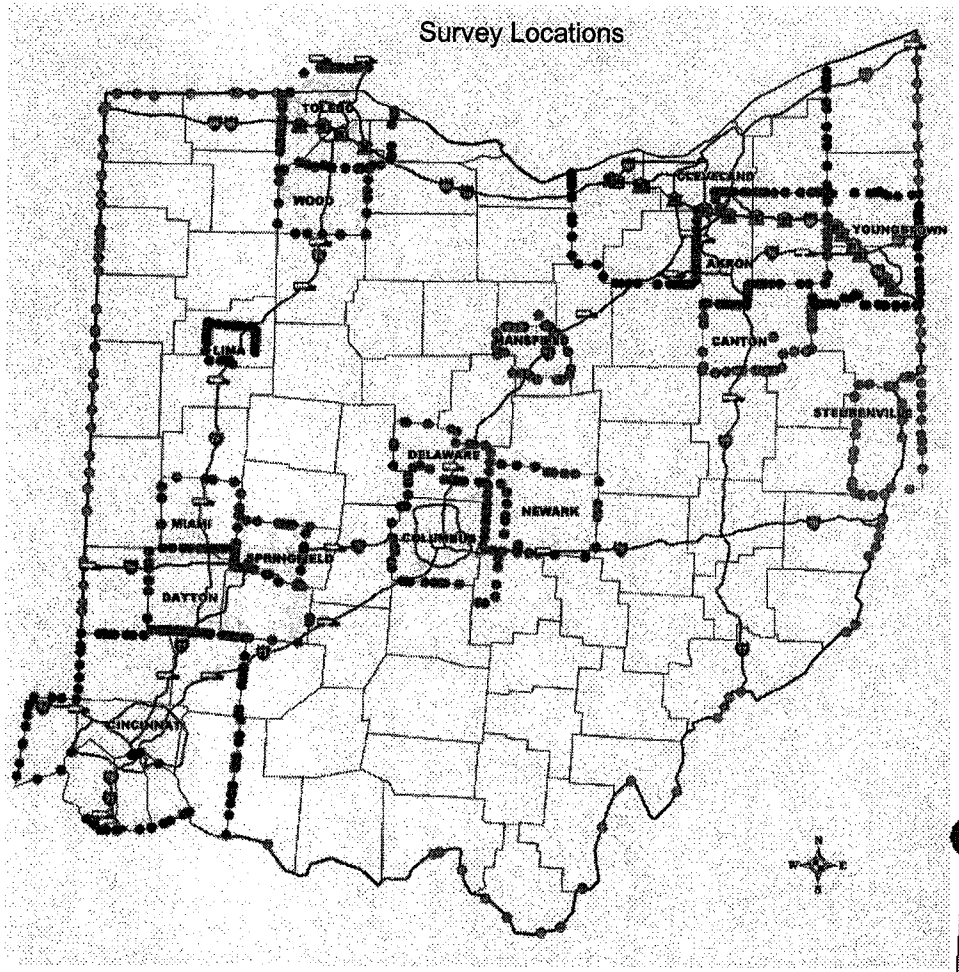
Overall Schedule

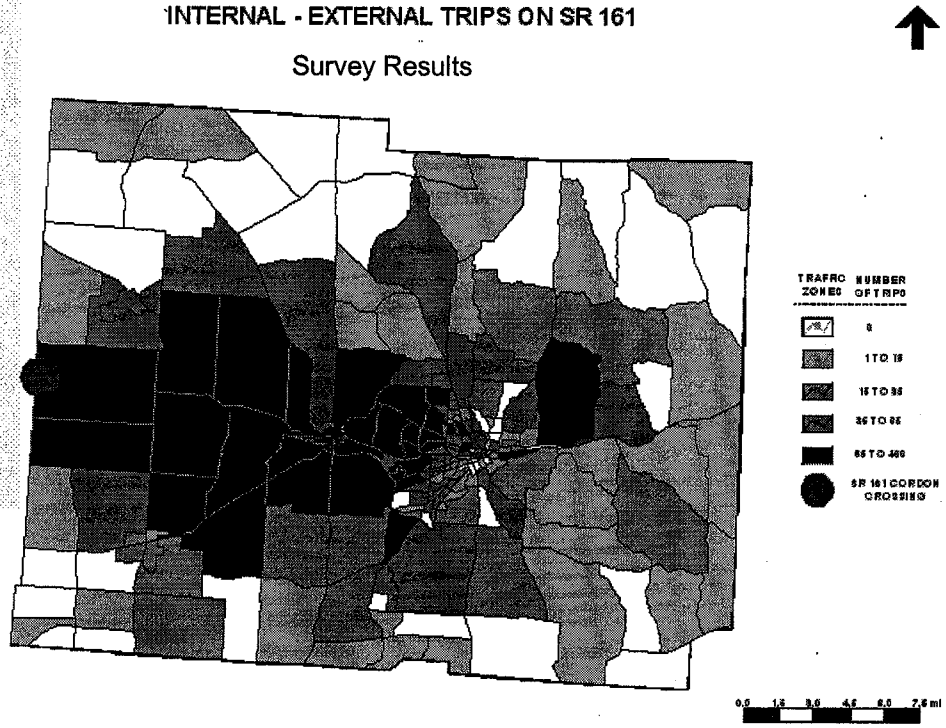


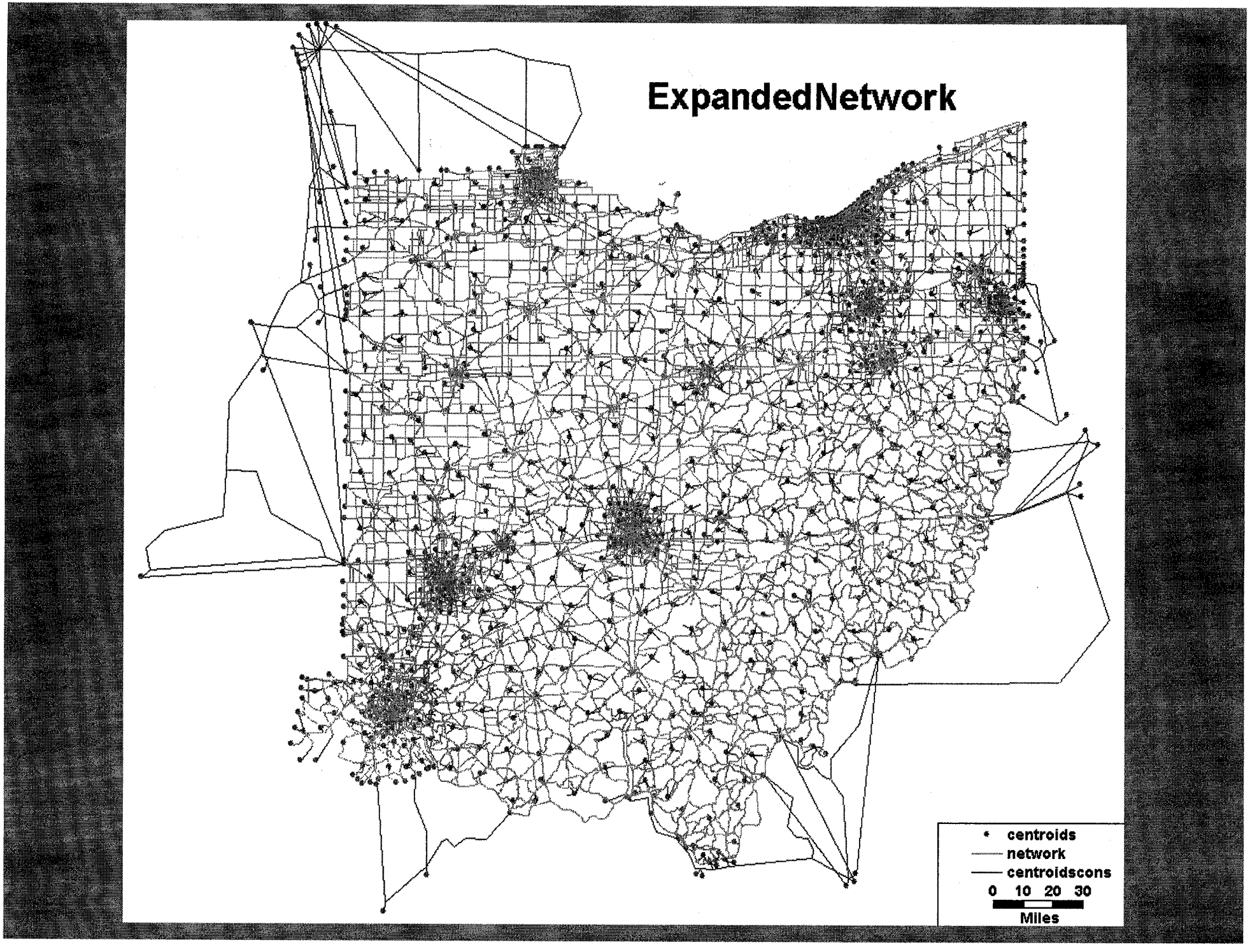
Data Collection Schedule

SURVEY	Calendar Year Quarters											
	2000-4	2001-1	2001-2	2001-3	2001-4	2002-1	2002-2	2002-3	2002-4	2003-1	2003-2	2003-3
Household Survey Pretest	wp3.1											
Rural Area Household Survey		survey			survey			survey				TM3.1
Long Distance Survey Pretest		wp3.2										
Long Distance Travel Survey			survey			survey			survey			TM3.2
GPS Under-reporting Survey		survey			survey			wp3.4				
Establishment Survey Pretest		wp3.3										
General Establishment Survey			survey	survey	survey	survey	survey	survey	survey	TM3.3		
Stated Preference Survey											survey	TM3.7
Lima Survey		survey			survey	TM3.8						
Toledo Survey		survey			survey	TM3.9						
Springfield Survey				survey			survey	TM3.10				
Dayton Survey				survey			survey	TM3.11				
Canton Survey						survey			survey	TM3.12		
Akron Survey						survey			survey	TM3.13		
Youngstown Survey							survey					TM3.14
Steubenville Survey							survey					TM3.15
Mansfield Survey						survey			present	TM3.16		

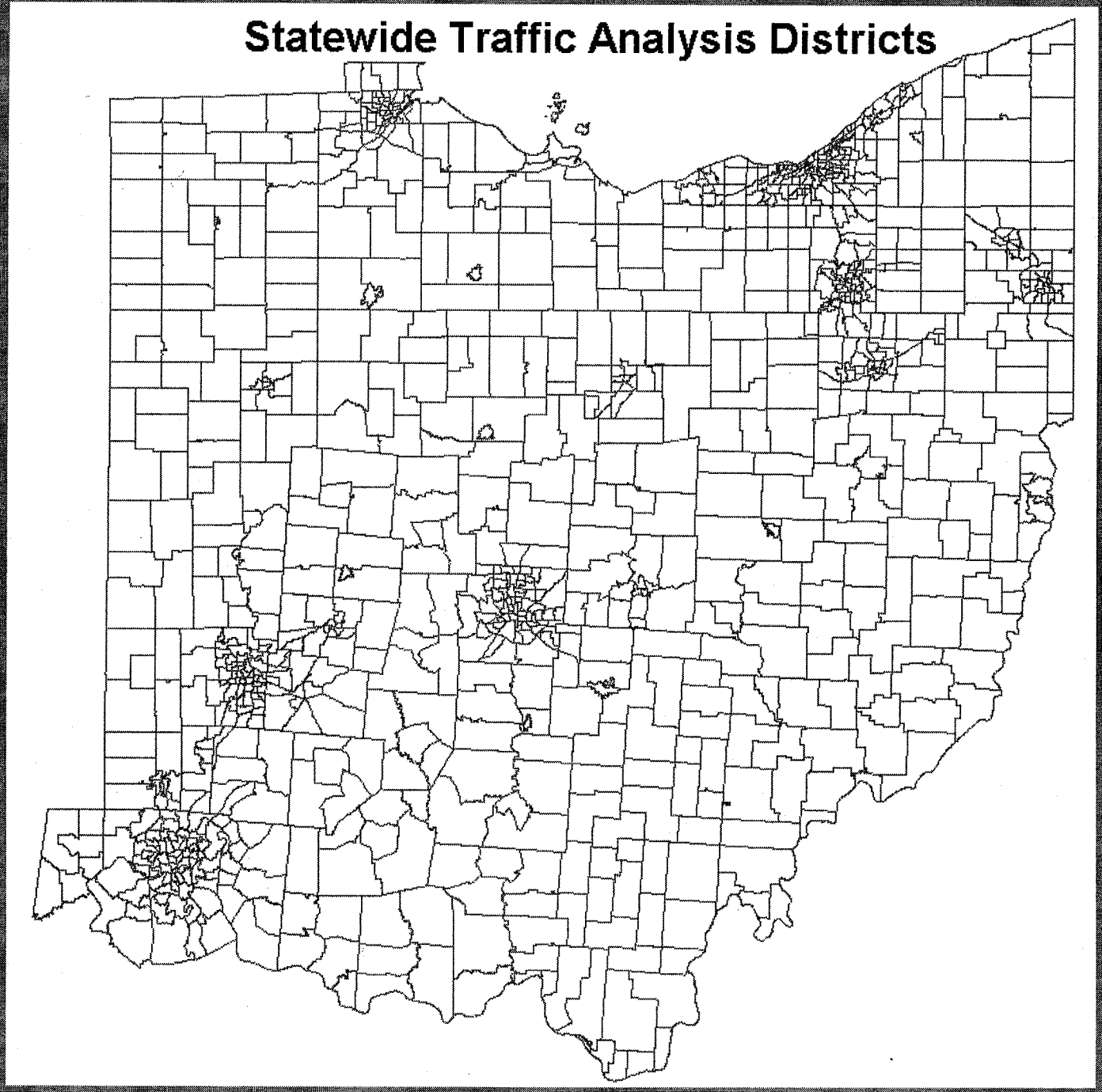
MPO Cordon Surveys





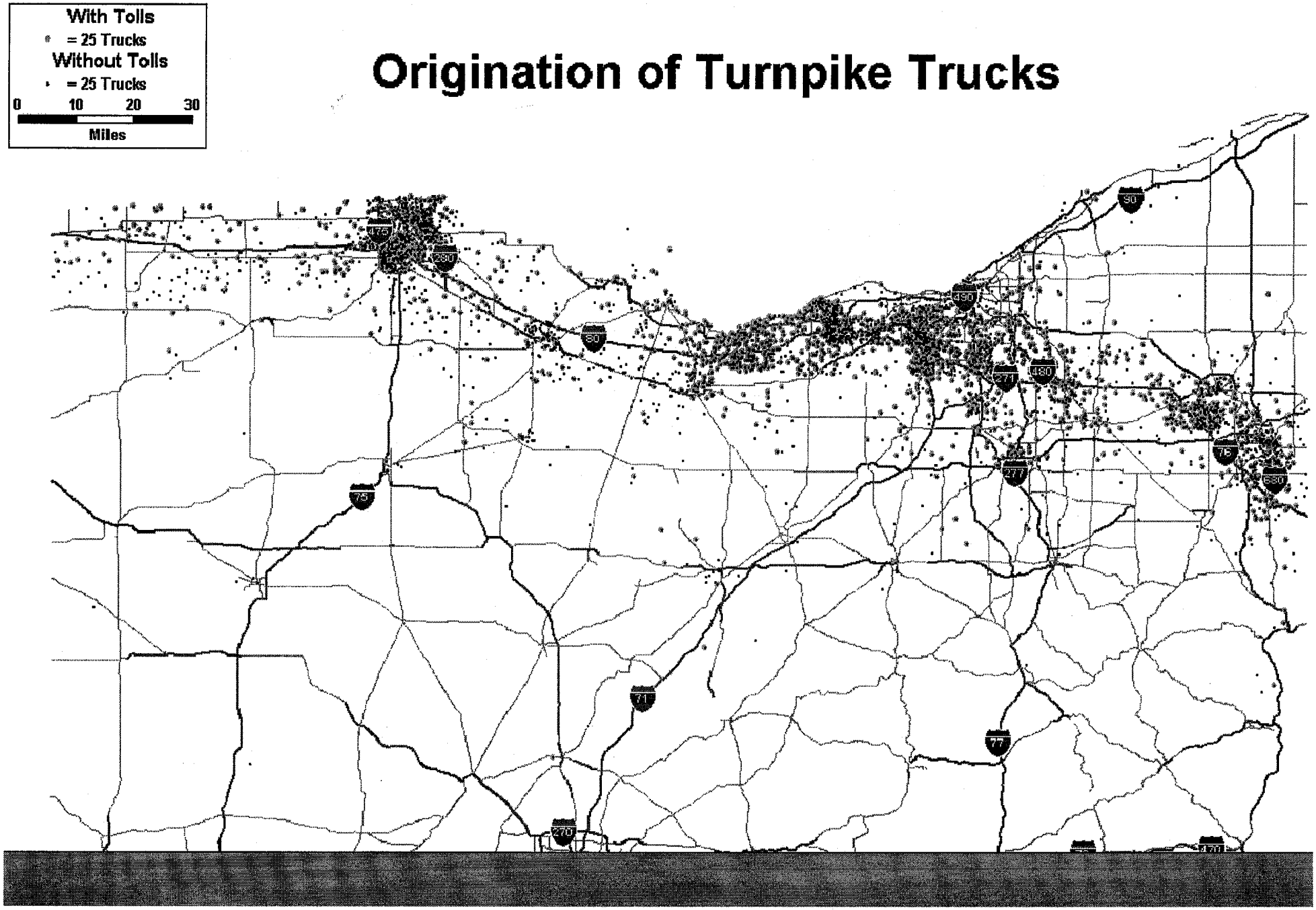

ExpandedNetwork
centroids
network
centroidscons
0 10 20 30
Miles

Statewide Traffic Analysis Districts

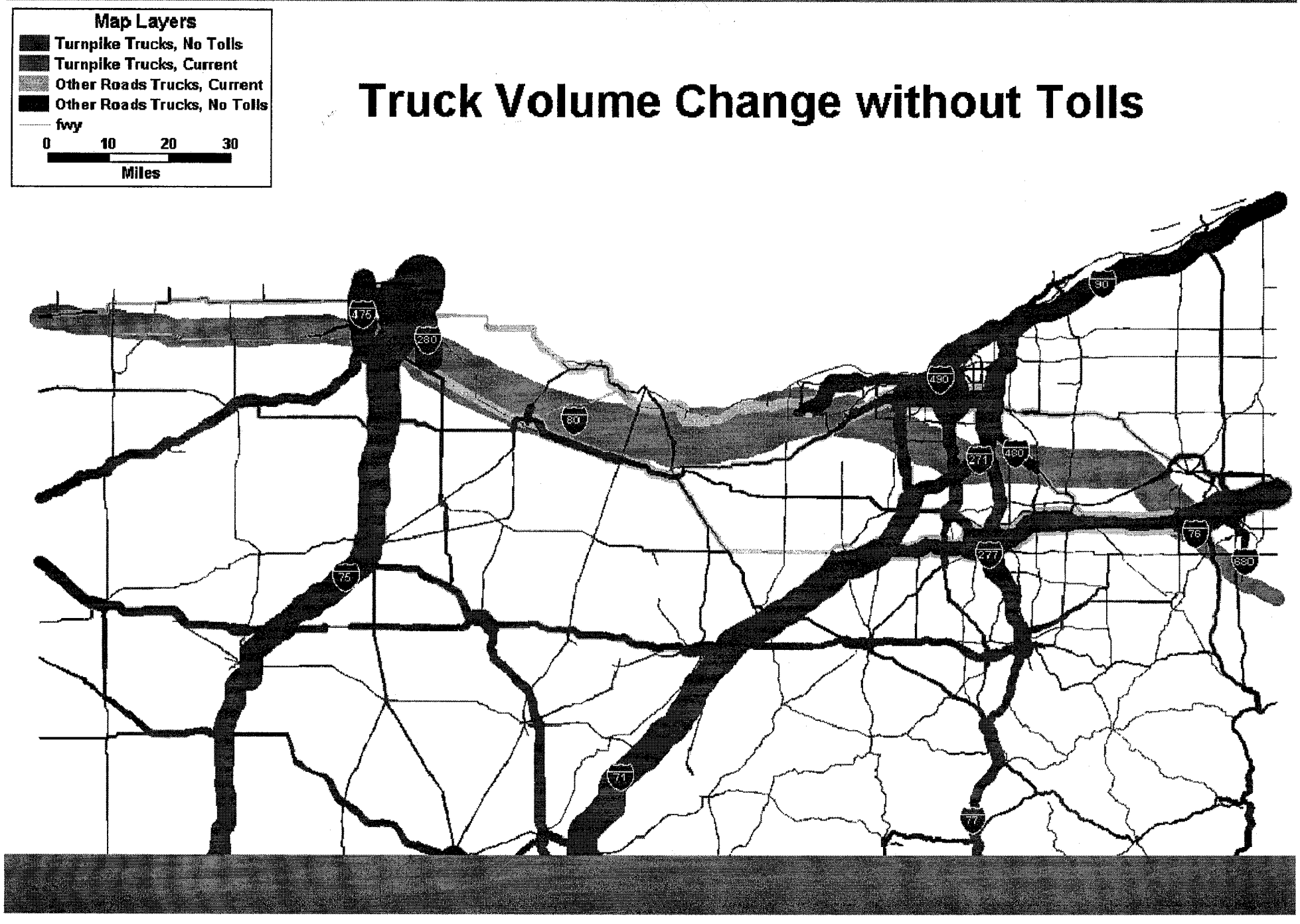


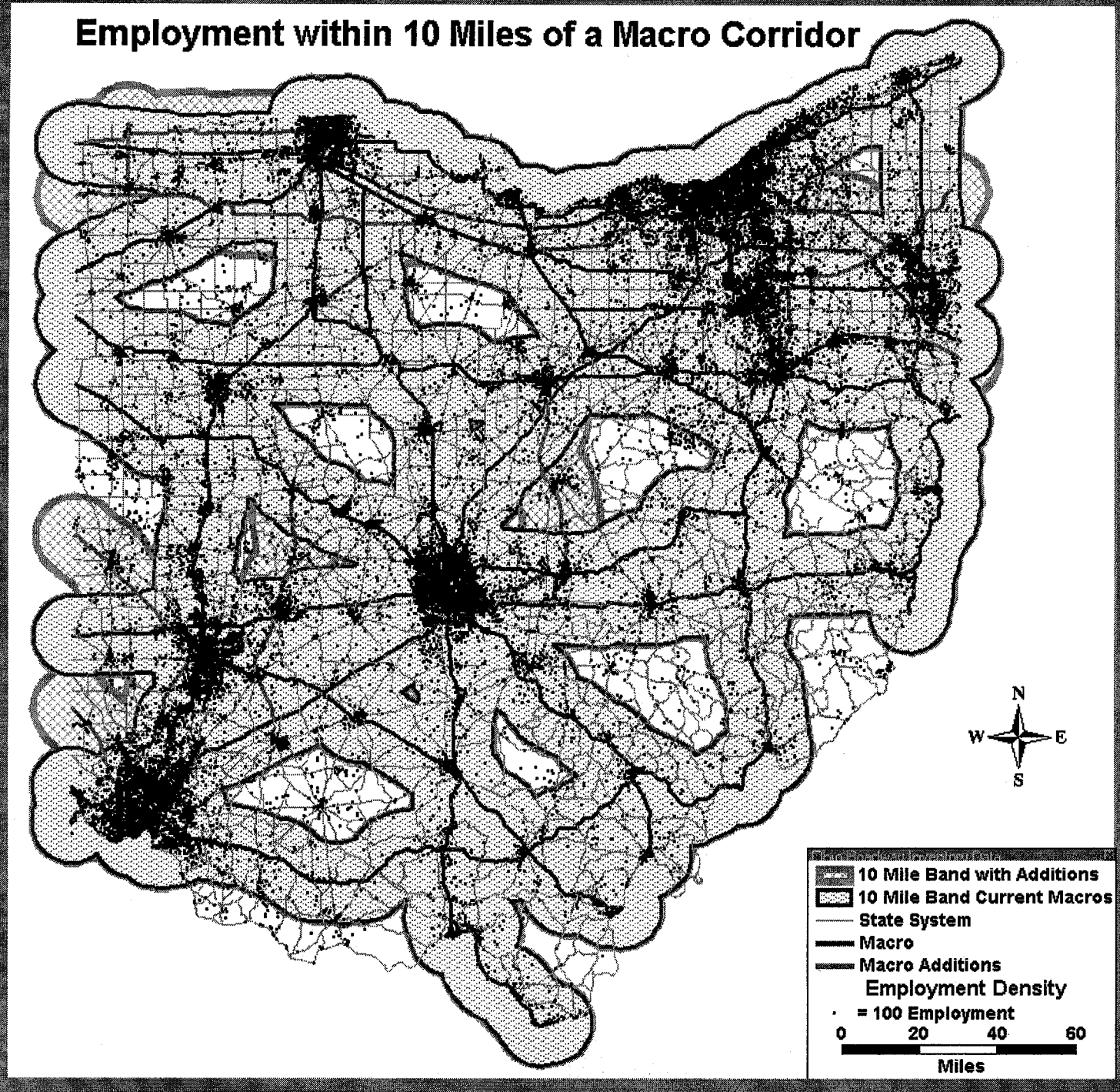
PROPORTION OF LONG DISTANCE TRAVEL
STATE SYSTEM
FUNCTIONAL CLASSES 1, 2, 6, 11, 12, 14

Origination of Turnpike Trucks

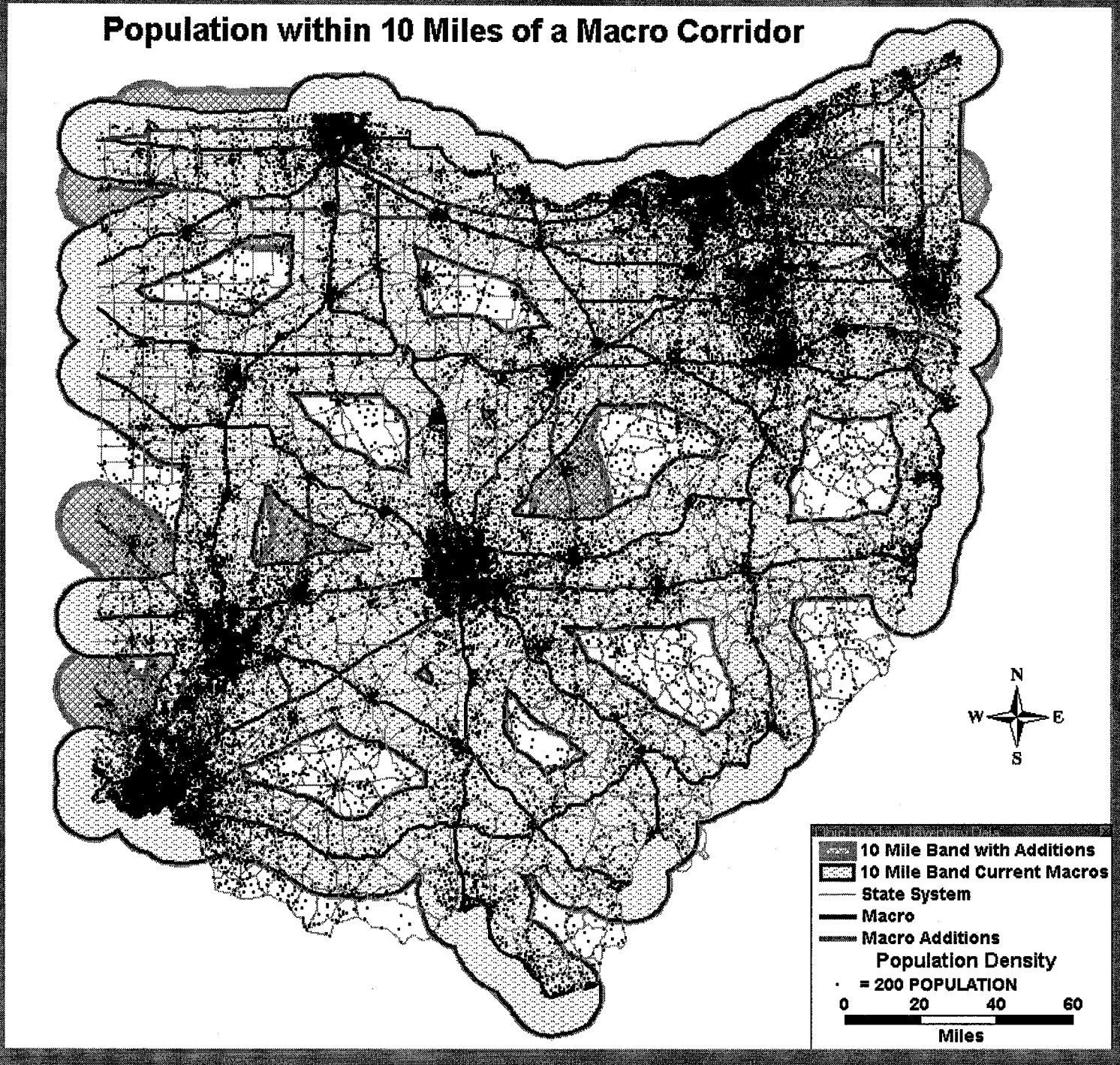


Truck Volume Change without Tolls

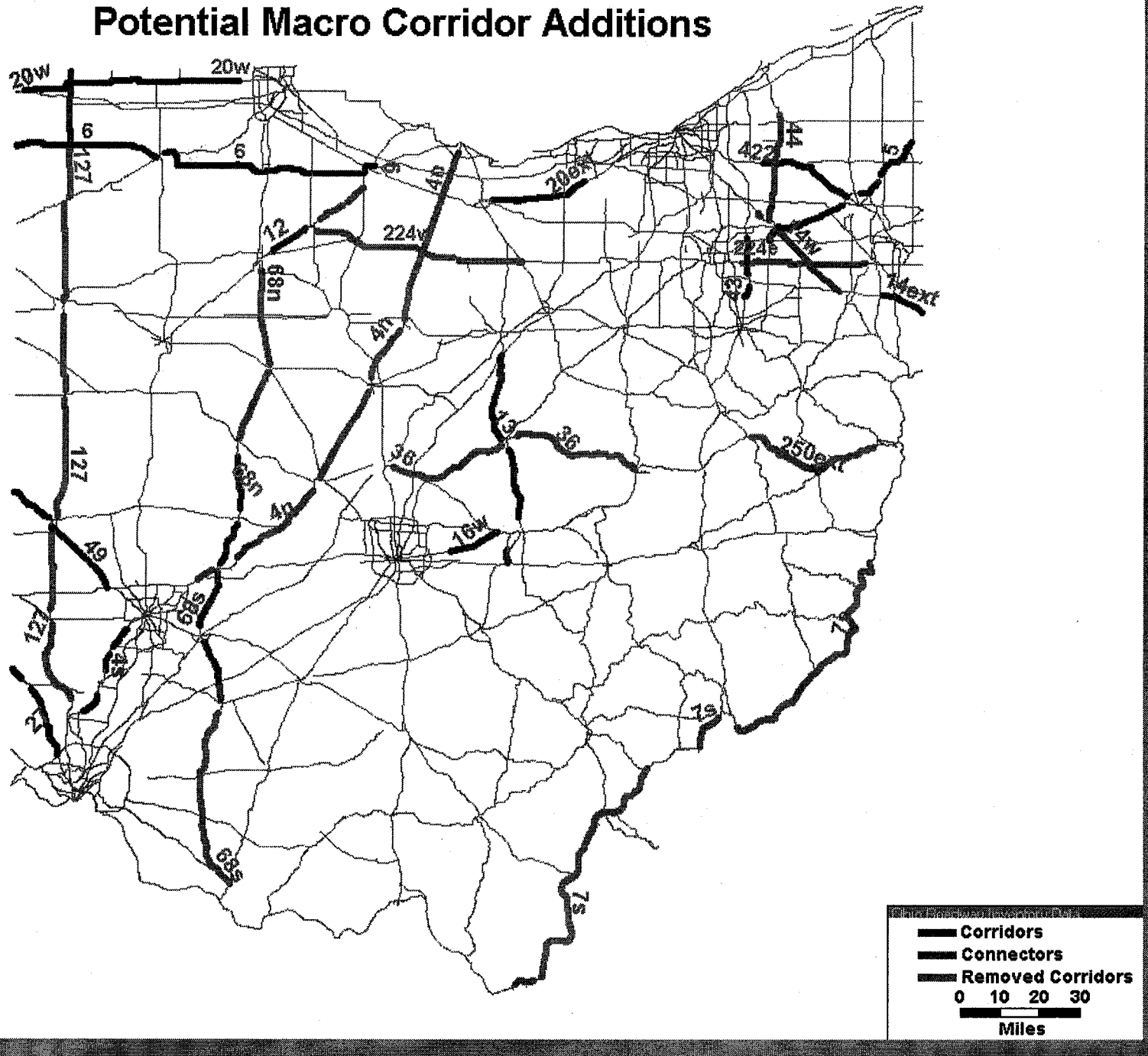



Employment within 10 Miles of a Macro Corridor
N
W
E
S
10 Mile Band with Additions
10 Mile Band Current Macros
State System
Macro
Macro Additions
Employment Density
= 100 Employment
0
20
40
60
Miles

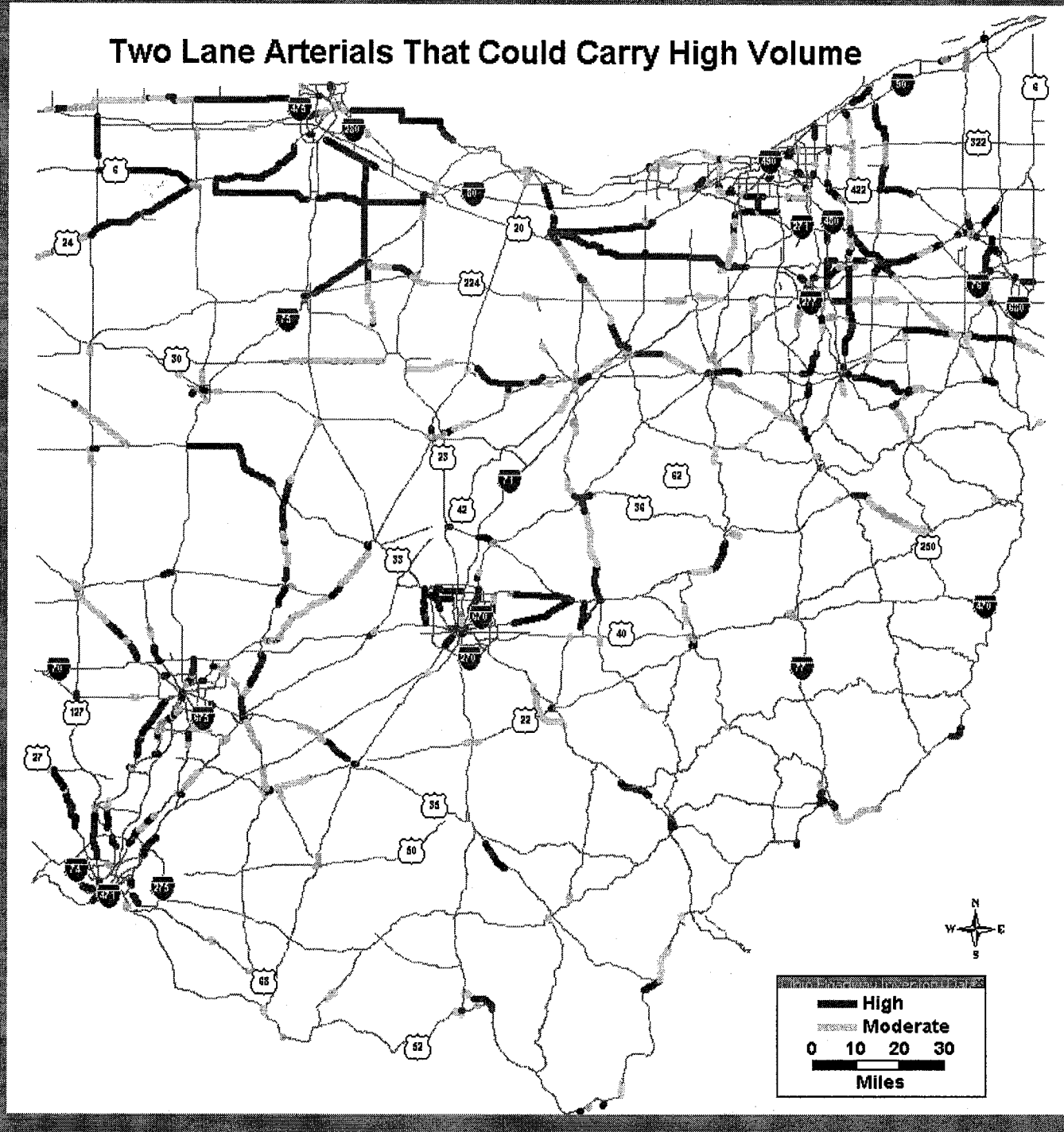
Population within 10 Miles of a Macro Corridor



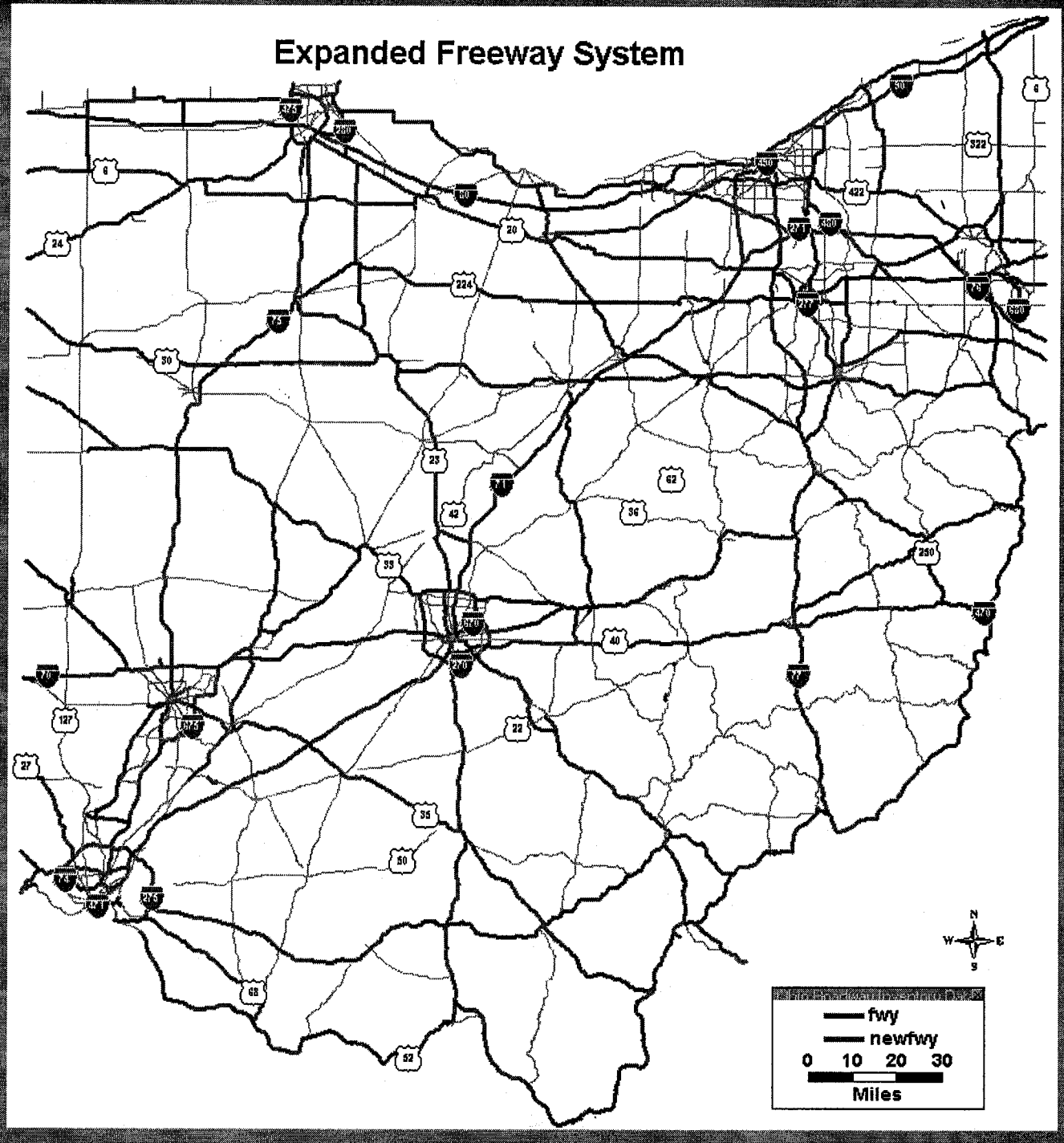
Potential Macro Corridor Additions



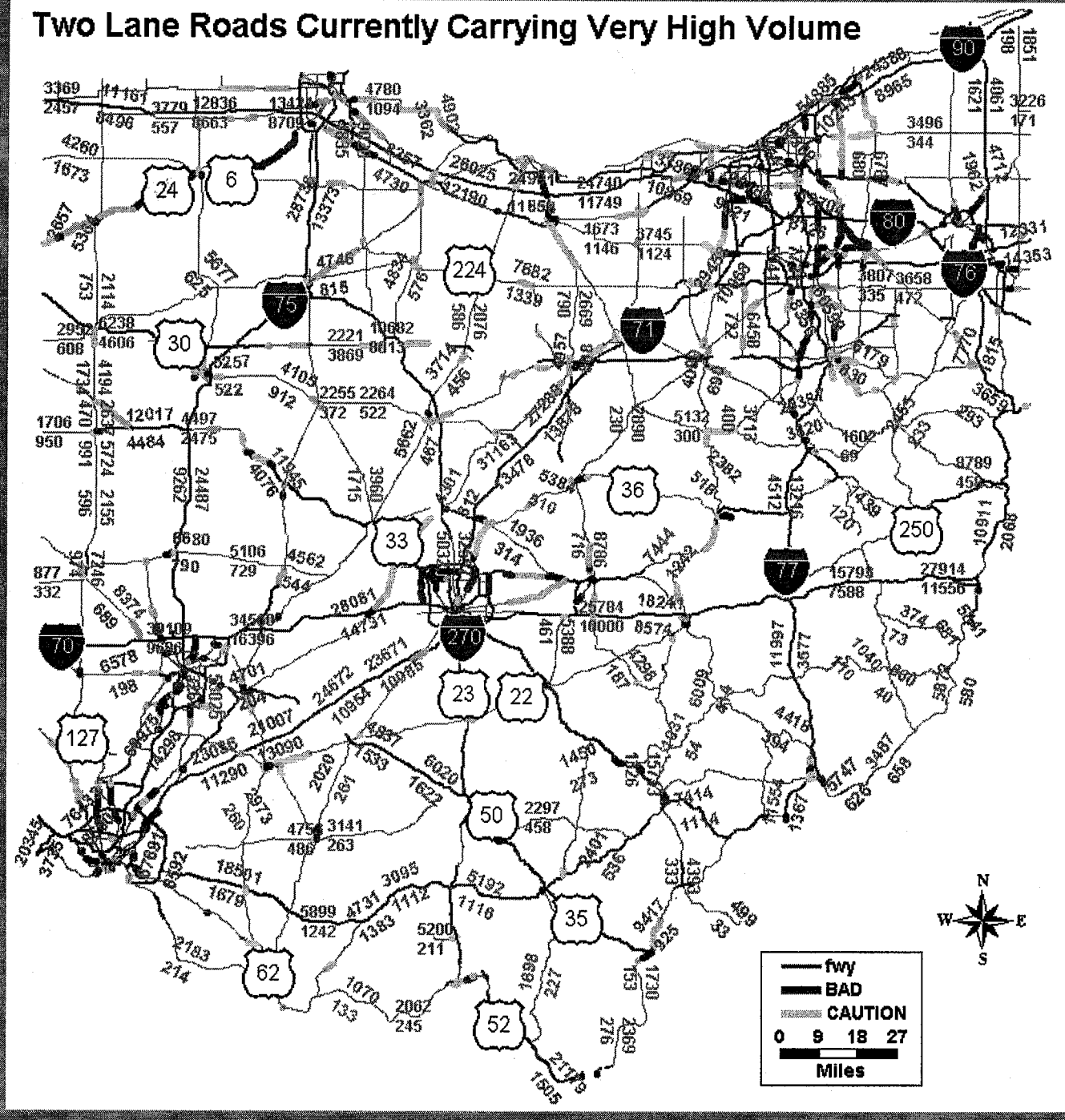
Two Lane Arterials That Could Carry High Volume



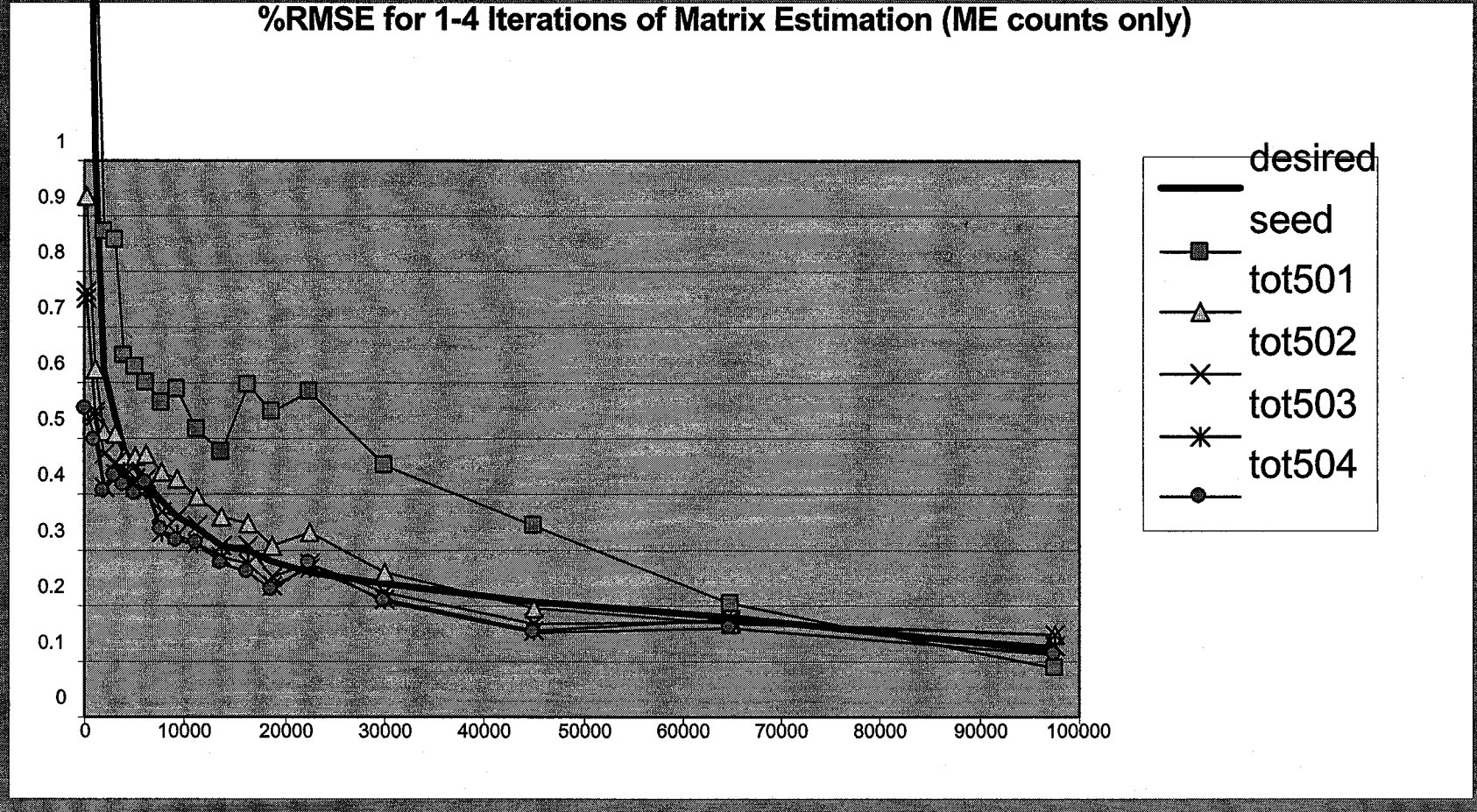
Expanded Freeway System Based on Federal Functional Class 02 Roads



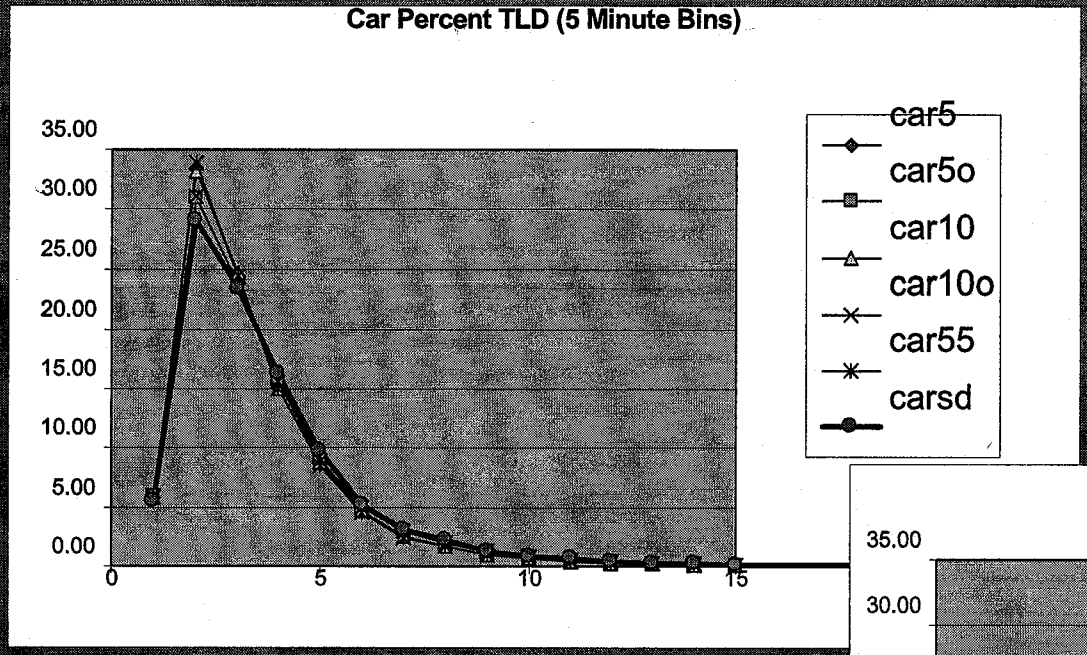
Two Lane Roads Currently Carrying Very High Volume

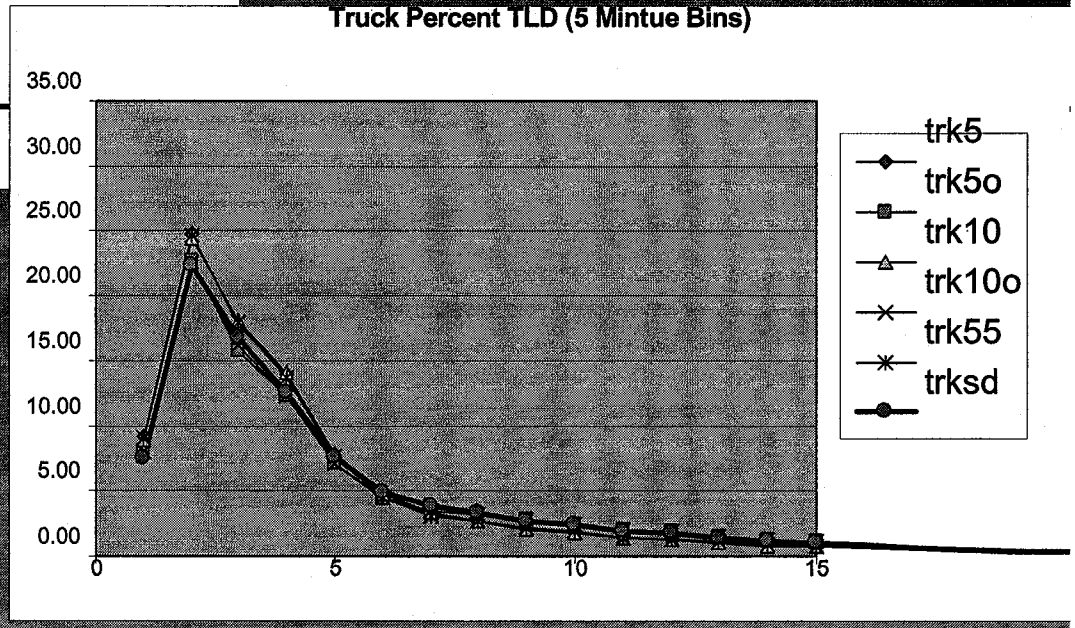


%RMSE Indicates 3 Iterations of ME are Sufficient to Meet the %RMSE Validation Criteria, Additional Iterations Produce Only Marginal Gains

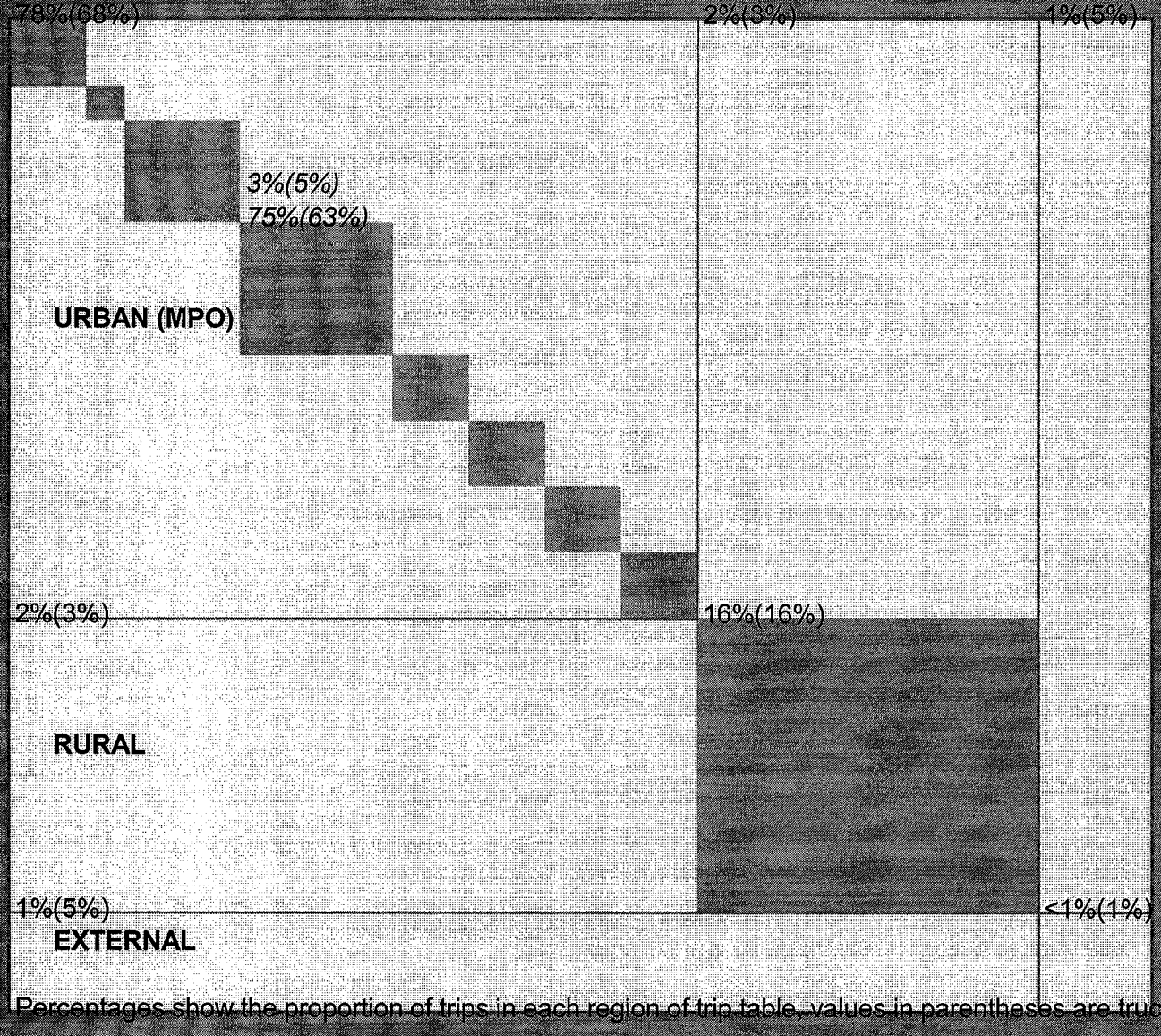


Some Shortening of Trip Lengths Occurs, However Little Difference Betwe and 10 Iterations





Seed Trip Table Data Source Schematic



Percentages show the proportion of trips in each region of trip table, values in parentheses are trucks

Statewide Network Areatypes